

# Respiratory Protection, Infection Control, and Preparing for Pandemic Influenza



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NIOSH Personal Protective Technology Program Healthcare  
Stakeholder Meeting  
June 18, 2013

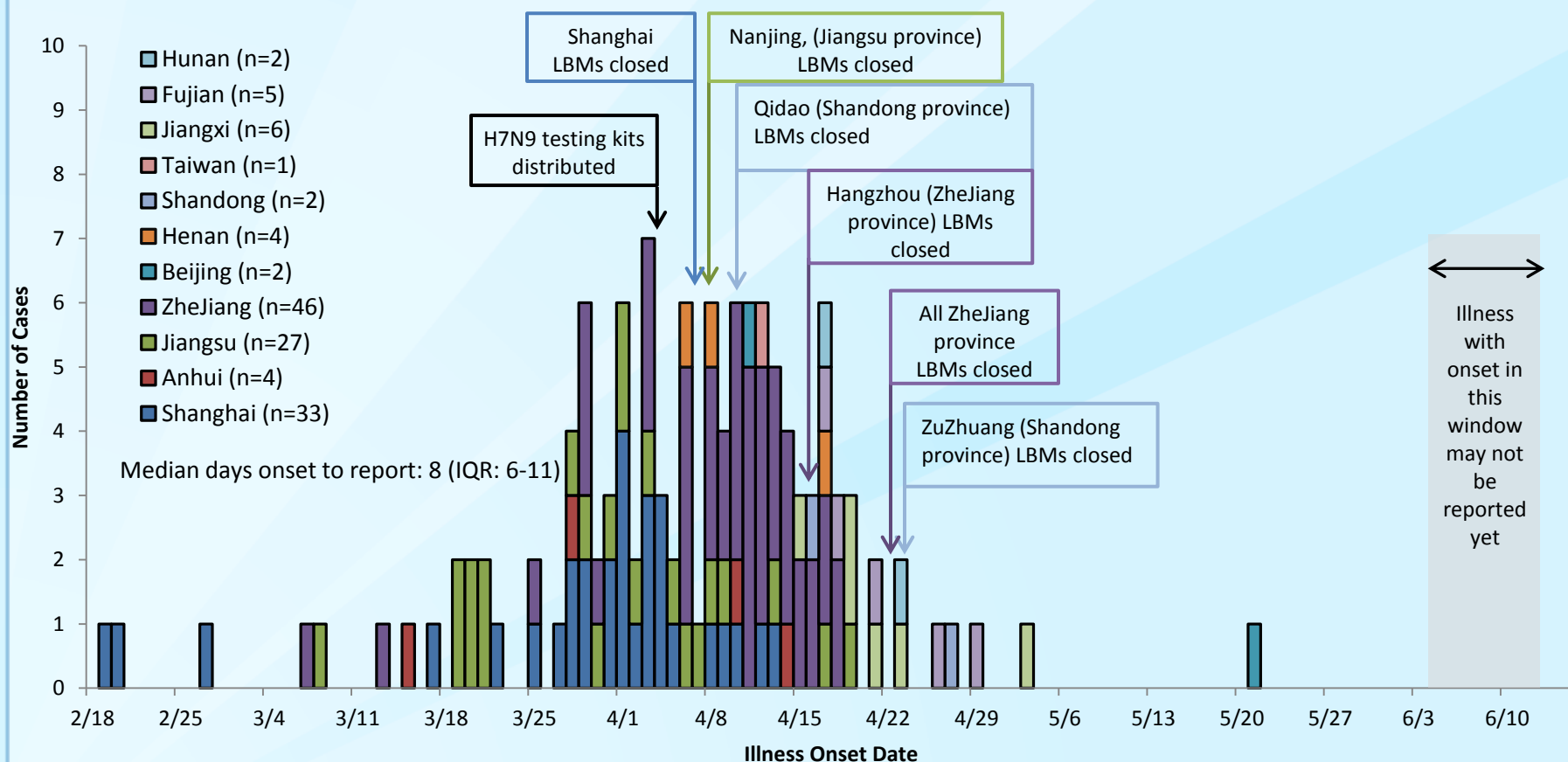


U.S. Department of Health and Human Services  
Centers for Disease Control and Prevention

# Agenda

- ❑ **Before H1N1 (Pandemic Preparedness 1.0)**
- ❑ **The H1N1 Experience**
- ❑ **After H1N1 (Pandemic Preparedness 2.0)**
  - Transmission research and new product development
  - Improving the guidance development process
  - Stockpile decisions
- ❑ **H7N9**

# Epi-Curve of Avian Influenza A (H7N9) Virus Cases by Onset of Illness Date and Province, Municipality, or Area, 18 Feb – 13 Jun 2013 (N=132)



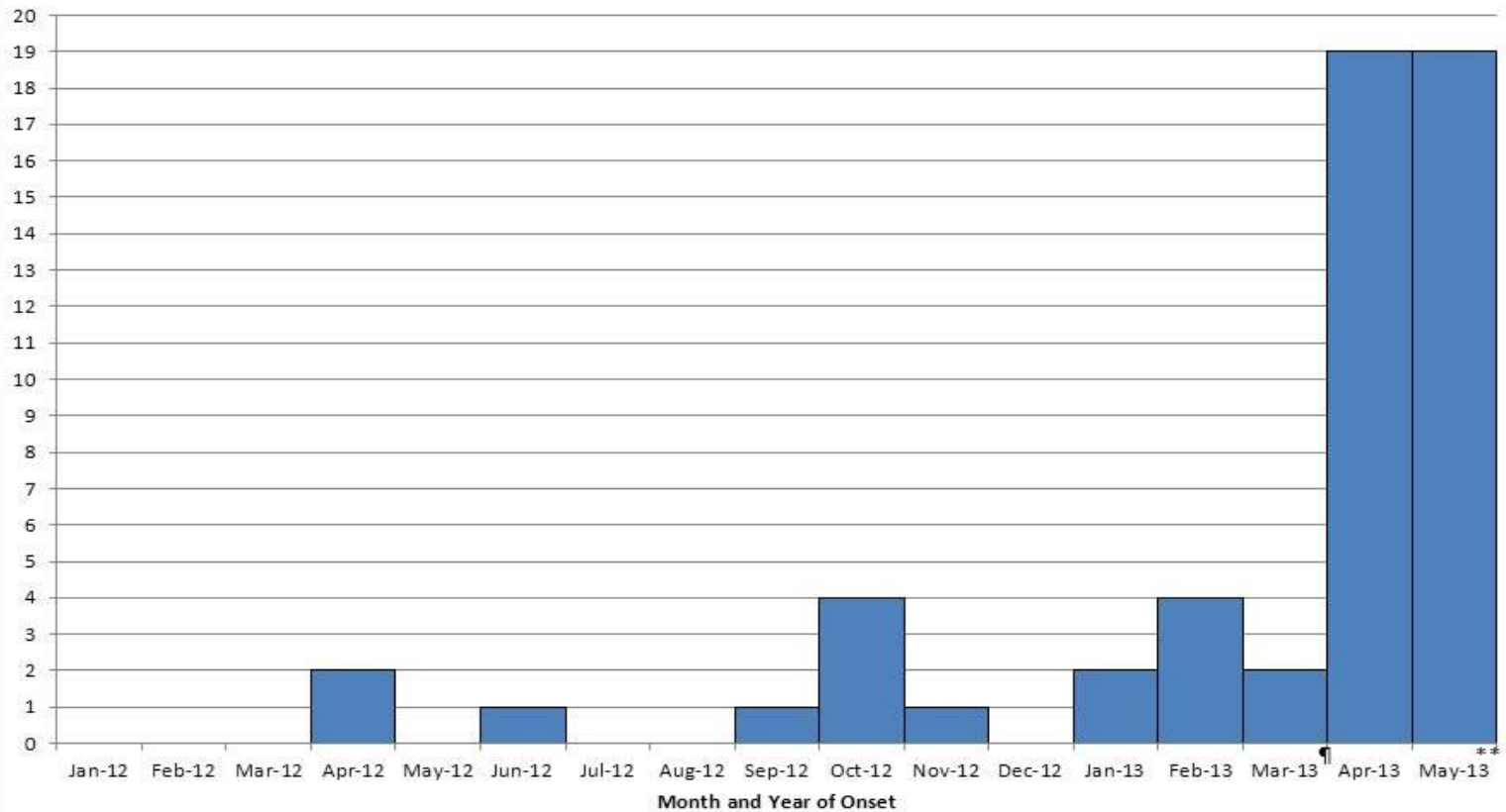
<sup>1</sup> Onset dates not available for all cases

06/14/2013

These data include information received by 1200 EDT on the date prior to this report

# MERS-CoV Epi Curve

**Middle East Respiratory Syndrome Coronavirus (MERS-CoV) Reported Cases, 2012--2013- Total (Deaths): 55 (30)**



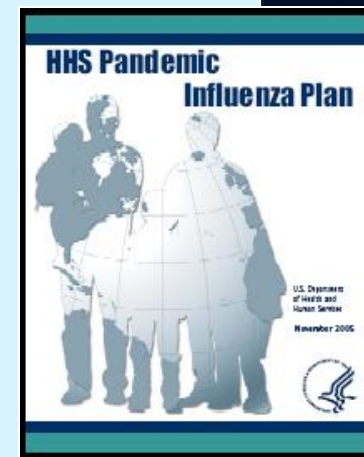
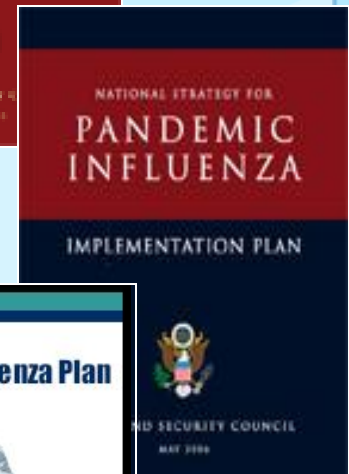
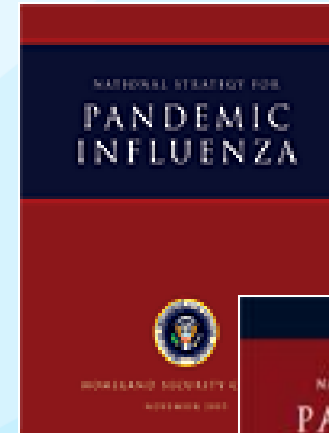
¶ Assumes that the two cases included in the Mar 23, 2013 WHO announcement had symptom onset during March 2013.

\*\* Assumes that the 6 cases (Case No. 42,43,44, 52,53,55) had symptom onset during May 2013

**BEFORE H1N1  
(PANDEMIC PREPAREDNESS 1.0)**

# National Strategy Pandemic Plans

- ❑ National Strategy for Pandemic Influenza
- ❑ National Strategy for Pandemic Influenza: Implementation Plan
- ❑ HHS Pandemic Influenza Plan
- ❑ HHS Implementation Plan



# **Actions in the National Strategy Implementation Plan on PPE**

- ❑ **Chapter 9 – INSTITUTIONS: PROTECTING PERSONNEL AND ENSURING CONTINUITY OF OPERATIONS**
  - 9.1.4 – Provide guidance to individuals on infection control behaviors they should adopt pre-pandemic, and the specific actions they will need to take during a severe influenza season or pandemic, such as self-isolation and protection of others if they themselves contract influenza.
    - 9.1.4.1 – HHS, in coordination with DHS, DOL, OPM, Department of Education, VA, and DOD, shall develop sector-specific infection control guidance to protect personnel, governmental and public entities, private sector businesses, and CBOs and FBOs, within 6 months.

## **Respirator Guidance – May 2007**

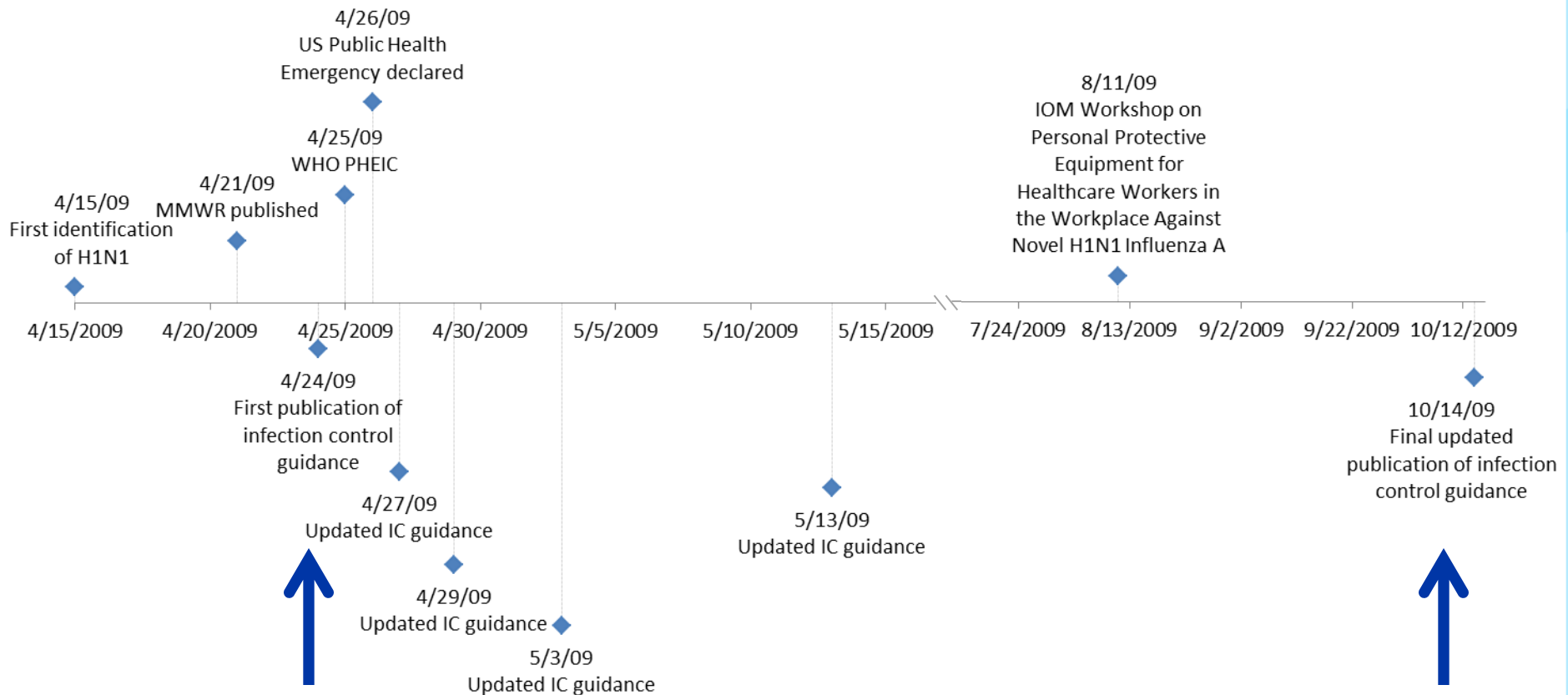
- ❑ **Interim Public Health Guidance for the Use of Facemasks and Respirators in Non-Occupational Community Settings during an Influenza Pandemic**
  - Acknowledged absence of scientific data, recommendations based on public health judgment and on the historical use of facemasks and respirators in other settings:
    - Avoid close contact and crowded conditions during an influenza pandemic (rather than depend on respirators or facemasks).
    - Consider using a facemask when entering crowded settings, both to protect the nose and mouth from other people's coughs and to reduce the wearers' likelihood of coughing on others.
    - Consider using a respirator when close contact with an infectious person is unavoidable. This can include selected individuals who must take care of a sick person (e.g., family member with a respiratory infection) at home.
    - Facemasks and respirators should be used in combination with other preventive measures, such as hand hygiene and social distancing, to help reduce the risk for influenza infection during a pandemic.

# **THE H1N1 EXPERIENCE**

# Decisions During the H1N1 Response

- ❑ When to publish information on cases
- ❑ Should schools be closed to suppress transmission
- ❑ Recommendations for antiviral drug treatment / prophylaxis
- ❑ **Recommendations for personal protective equipment for HCWs**
- ❑ Distribute countermeasures from stockpile
- ❑ Warning on travel to affected areas
- ❑ Initiate vaccine candidate development
- ❑ Contract with industry to produce vaccine (May)
- ❑ Provide funding to states to plan vaccination program (July)
- ❑ Guidance on priority groups for vaccination (ACIP July 31)
- ❑ Initiate vaccination program (Oct 5)
- ❑ Recommend vaccination for general population (Dec)
- ❑ Decide to fill and finish bulk vaccine (recurrent)
- ❑ Should school vaccination clinics be cancelled (Jan 2010)

# Infection control issues in the H1N1 response: early and often



25.4M respirators and 14M surgical masks were deployed in the Spring as part of the initial response (April)

An additional 59.7M respirators were deployed in the Fall in response to the commercial supply shortage (October)

## **IOM Workshop, August 2009**

- ❑ **Recommendations for necessary respiratory protection for healthcare workers against novel H1N1 influenza A**
- ❑ **Recommendation 1: Use Fit-Tested N95 Respirators**
  - Use current CDC guidance
  - Employers should ensure use and fit testing of N95 respirators and healthcare workers should use the equipment as required
- ❑ **Recommendation 2: Increase Research on Influenza Transmission and Personal Respiratory Protection**
  - Relative contribution of various routes of influenza transmission
  - Effectiveness of personal respiratory protection technologies in a variety of clinical settings through randomized clinical trials
  - Design and develop the next generation of personal respiratory protection technologies for healthcare workers to enhance safety, comfort, and ability to perform work-related tasks

# **AFTER H1N1 (PANDEMIC PREPAREDNESS 2.0)**

# H1N1 Retrospective

## ❑ Page viii

- Insufficient evidence base to support guidance on the appropriate level of respiratory protection (N95 respirators or surgical masks) to prevent occupational acquisition of 2009 H1N1 influenza by health care workers
- PPE from SNS sometimes unfamiliar → fit testing challenges.

## ❑ P35-36

- Fit testing issues
- Challenges from apparent disagreement among federal agencies
- Guidance beyond the healthcare setting

# H1N1 Improvement Plan

## ❑ Page vii-viii

- Determine stockpiling requirements for RPDs
- Encourage NIOSH and FDA approval
- Monitor safety, effectiveness, and shortages of RPDs
- Conduct research to better understand transmission
- Innovate and strengthen RPD design, use, testing, and certification
- Develop & revise use / reuse policies
- PPE from SNS sometimes unfamiliar → fit testing challenges.

## ❑ P21-22

- NIOSH but not FDA approved N95s in SNS
- Respirators for community exposures

## Beyond H1N1

- ❑ **Research**
- ❑ **Guidance**
- ❑ **Stockpiling**

# What are the relative contributions of different modes of influenza transmission?

- ❑ **Contact transmission**
  - Direct – person to person
  - Indirect – involves a fomite
- ❑ **Droplet spray transmission - impaction on exposed mucous membranes**
- ❑ **Aerosol transmission – small droplet nuclei ( $< \sim 10 \mu\text{m}$ )**

# **What's needed to protect healthcare workers from becoming infected with influenza from a workplace exposure?**

- ❑ **Respiratory Protection Effectiveness Clinical Trial (ResPECT) - Compare N95s v Surgical Masks; outcome influenza infection**
- ❑ **A variety of engineering solution studies**

# Developing a better respirator

- ❑ **Textile approach**
- ❑ **Establishing requirements (VA and NIOSH)**
  - Project B.R.E.A.T.H.E. - Better Respiratory Equipment using Advanced Technologies for Healthcare Employees
  - B95
- ❑ **BARDA funding announcement for improved masks and respirators for 2014**

## **Work within the interagency to improve guidance development for respiratory protection**

- ❑ **Before emergency, develop and clear generic guidance for respiratory protection / infection control for a severe illness caused by a novel virus; highly protective**
- ❑ **Upon detection of a novel virus infecting people (severity / transmissibility issues) rapid refinement of generic guidance; highly protective**
  - Situation should dictate urgency
  - CDC develops guidance
  - Interagency reviews / approves guidance (rapidly)
- ❑ **When more information is available, adjust guidance**
  - Potential for disagreement due to incomplete science
  - Rapid escalation

## **Additional guidance approaches**

- ❑ Recommendations that would prolong the existing and supplies of respirators / surgical masks**
- ❑ Address (patient) source control interventions to reduce worker exposure**

## **Current Estimated Availability of N95 Filtering Facepiece Respirators (FFRs) and Surgical Masks in the United States**

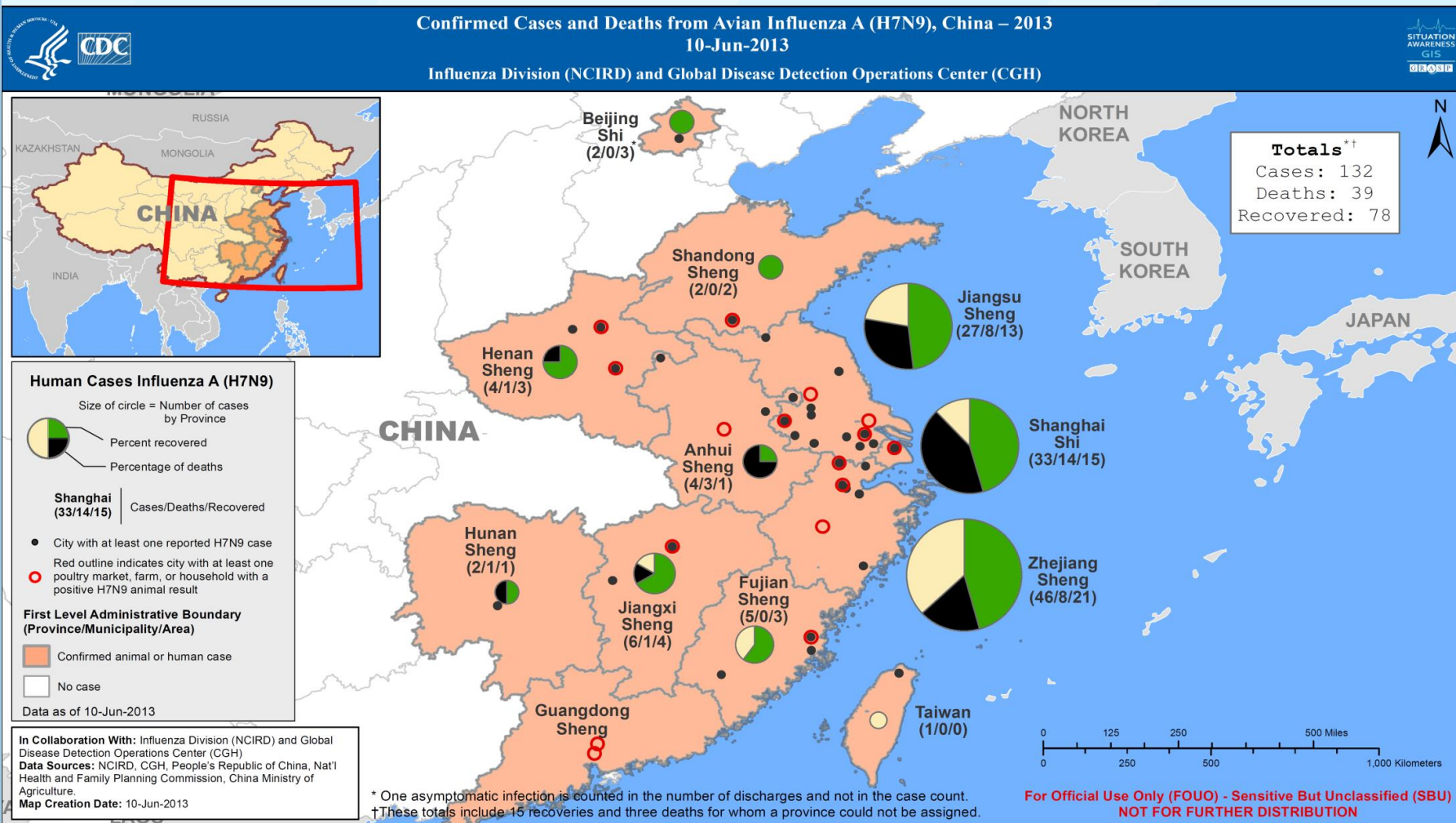
<b>Location</b>	<b>N95 FFRs</b>	<b>Surgical Mask</b>
<b>Strategic National Stockpile</b>	17.8 M	30.8M

**A very small proportion of the respirators and masks that would be needed in a pandemic**

# **Next steps in respiratory protection, infection control and pandemic preparedness**

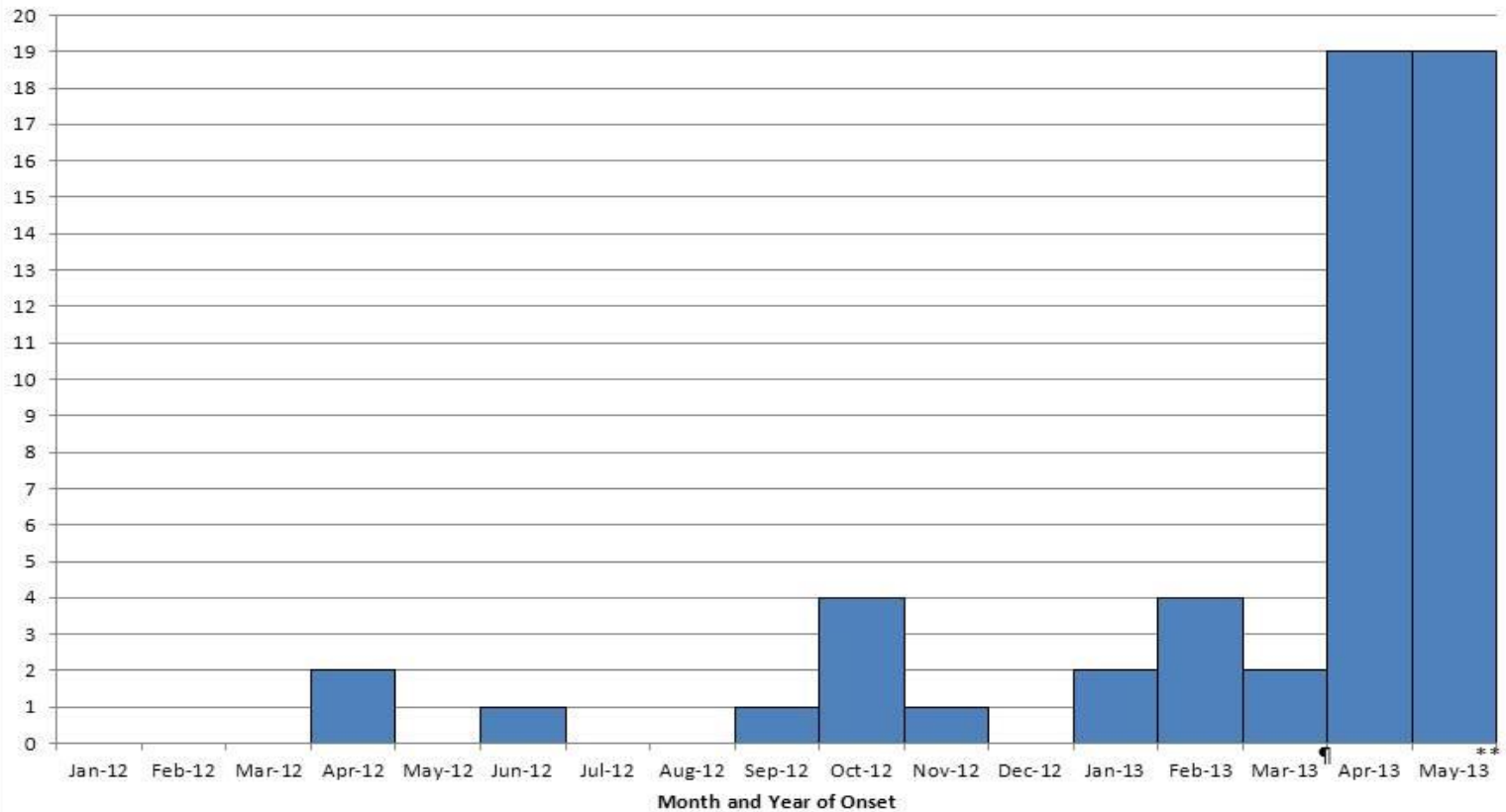
- Better evidence base for protection / transmission
  - Infectious dose / filtering requirement
- New products
- Administrative and Engineering controls
- Emphasize source control (masks on ill)
- Stockpile to bridge the gap from current supplies to increased production
- Measure and improve infection control practice

# Confirmed H7N9 Human and Animal Cases



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